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Research Article

Antibiotic Susceptibility of the First Streptococcus Constellatus Isolated from Epidural Abscess in Dakar

Abstract

Streptococcus constellatus can sometimes cause serious invasive infections, as infections of the liver and lung, brain abscesses, bacteraemia, endocarditis and intra-abdominal infections.

The study aimed to identify *S. constellatus* and to assess their susceptibility to several antibiotics.

Methods: In a 59-year-old patient hospitalized in intensive unit care for an epidural abscess, pus was collected and bacterial were grown, then bacterial identification was performed by routine laboratory methods.

Antimicrobial susceptibility testing was performed using standard disk diffusion method and MIC of several antibiotics was determined by using the BioMérieux Vitek 2.

Results: *S. constellatus* was identified in abscess and was resistant to penicillin, aminoglycosides, macrolides, lincomycin, and fluoroquinolones. Only vancomycin, pristinamycin and rifampin were active.

Conclusion: *S. constellatus* is considered commensal organism, but identification and antibiotic susceptibility of this species are necessary for good management of the abscess.

Abbreviations

MIC: Minimum Inhibitory Concentration; SAG: Streptococcus Anginosus Group; ATCC: American Type Culture Collection; CLSI: Clinical Laboratory Standard Institute

Introduction

Streptococcus constellatus is member of the Streptococcus anginosus Group (SAG) that are considered commensal organisms [1]. SAG isolates are part of the normal flora of the human respiratory, gastrointestinal and genitourinary tracts [2]. However, they can sometimes cause serious invasive infections, as infections of the liver and lung, brain abscesses, bacteraemia, endocarditis and intra-abdominal infections [3, 4].

One of the most striking features of species in the SAG is their tendency to cause abscesses and *S. intermedius* and *S. constellatus* are the main causes of deep abscess [5].

In most care of abscess, some type of drainage procedure associated with appropriate antibiotic treatment is sufficient [5].

SAG is generally considered to be susceptible to beta-lactam antibiotics and macrolides. However, increasingly; we are seeing the emergence of viridans and beta-haemolytic streptococci resistant to antibiotic [6].

In Senegal there is no data on *S. Constellatus* and this is the first strains isolated from abscess in Dakar.

The study aimed to identify *S. constellatus* and to assess their susceptibility to several antibiotics.

Materials and Methods

In a 59-year-old patient hospitalized in intensive unit care for an epidural abscess, pus was collected and bacterial were grown.

Bacterial identification was performed by routine laboratory methods including Gram stain, catalase reaction and biochemical analysis using the API 20 Strep test (BioMérieux Vitek 2).

Antimicrobial susceptibility testing was performed using standard disk diffusion method (Oxoid Ltd, Basingstoke, and Hampshire, UK).

S.constellatus suspension were diluted to obtain a final concentration of 10^5 CFU/mL (an optical density of 0.5 on the McFarland scale) and inoculated on Mueller-Hinton supplemented with 5% sheep blood.

Antibiotics disk of penicillin, vancomycin, teicoplanin, gentamycin, erythromycin, lincomycin, pristinamycin, norfloxacin, and rifampicin were then placed on the inoculated plates.

Plates were incubated at 37 C under CO₂ atmosphere for 18–24 hours.

Quality control for antimicrobial susceptibility testing was performed using the ATCC 49619 strains of *S.pneumoniae*.

Susceptibility was determined based on Clinical Laboratory Standards Institute (CLSI) break points [7].

Also, MIC of several antibiotics was determined by using the BioMérieux Vitek 2.

Results

Bacterial identification was *S. constellatus*. table 1 shows the results of susceptibility testing of *S. constellatus* against antibiotics with disk diffusion method, while MIC values of 9 antibiotics tested are shown in table 2.

S.constellatus was resistant to many antibiotics. Penicillin, amino glycosides, macrolides, lincomycin, fluoroquinolones were not actives.

Table 1: Antibiotics susceptibility of *S.constellatus* (disk diffusion).

Antibiotics	Diameter(mm)	Interpretation
Penicillin	<6	R
Vancomycin	17	S
Teicoplanin	13	R
Gentamycin	13	R
Erythromycin	<6	R
Lincomycin	10	R
Pristinamycin	23	S
Norfloxacin	08	R
Rifampicin	23	S

R: Resistant; S: Susceptible.

Table 2: Antibiotics susceptibility of *S.constellatus* and MIC values (vitek2).

Antibiotics	MIC(mg/l)	Interpretation
Benzyl penicillin	>=8	R
Ampicillin	>=16	R
Cefotaxim	0.25	S
Levofloxacin	>=16	R
Erythromycin	>=8	R
Clindamycin	>=1	R
Linezolid	<=2	S
Vancomycin	1	S
Tetracyclin	>=16	R

R: Resistant; S: Susceptible; MIC: Minimum Inhibitory Concentration.

However, cefotaxim, pristinamycin, rifampin and vancomycin showed good activity with low MIC values of 0.25 mg/l and 1mg/l respectively.

Discussion

In our study, *S.constellatus* was isolated from epidural abscess in patient hospitalized. This was the first this strain has been isolated in Senegal. However in other countries, *S.constellatus* were identified as the cause of infections, including infections of liver and lung, brain abscesses, bacteraemia, endocarditis, invasive pyogenic infection 3,4,8].

Difficulties in identification strains isolates of the “*Streptococcus anginosus* group” (SAG; *Streptococcus intermedius*, *Streptococcus constellatus*, and *Streptococcus anginosus*), have caused confusion in determining their pathogenic potential, but using new powerful tool for rapid identification bacteria, makes it possible to differentiate these organisms [5]. Thus, it is necessary to equip the laboratories for good management of infectious diseases.

SAG was generally susceptible to penicillin, other beta-lactam antibiotics and macrolides [2,9,10]. However, in our study *S.constellatus* were resistant to penicillin, aminoglycosides, macrolides, lincomycin and fluoroquinolones. Macrolides and clindamycin resistance SAG were observed in other studies [11]. Also fluoroquinolones resistance SAG were observed in Germany, while they are habitually used for the therapy of purulent infections [2]. Our findings demonstrate that antibiotics resistance has emerged among SAG isolates.

Only vancomycin, pristinamycin and rifampin were active and should be therefore used in abscesses treatment.

Conclusion

S.constellatus is considered commensal organism, but identification and antibiotic susceptibility of this species are necessary for good management of the abscess.

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References

1. Facklam, R (2002) what happened to the streptococci: overview of taxonomic and nomenclature changes. Clin Microbiol Rev 2002; 15: 613–630. [Link: https://goo.gl/HdtFAM](https://goo.gl/HdtFAM)
2. Nadine A, Bettina E, Thomas RM (2009) Prevalence of erythromycin and clindamycin resistance among clinical isolates of the *Streptococcus anginosus* group in Germany. Journal of Medical Microbiology 58: 222–227. [Link: https://goo.gl/omw1bU](https://goo.gl/omw1bU)
3. Clarridge JE, Atorri S, MusherDM, Hebert J, Dunbar S (2001) *Streptococcus intermedius*, *Streptococcus constellatus*, and *Streptococcus anginosus* (“*Streptococcus milleri* group”) are of different clinical importance and are not equally associated with abscess. Clin Infect Dis 32: 1511–1515. [Link: https://goo.gl/EJaTrW](https://goo.gl/EJaTrW)
4. Rashid RM, Salah W, Parada JP (2007) *Streptococcus milleri* aortic valve endocarditis and hepatic abscess. J Med Microbiol 56: 280–282. [Link: https://goo.gl/T36sHs](https://goo.gl/T36sHs)

5. Jill E III, Silvia A, Daniel MM, Jeff H, Sherry D (2001) Streptococcus intermedius, Streptococcus constellatus, and Streptococcus anginosus ("Streptococcus milleri Group") are of Different Clinical Importance and are not equally associated with abscess. Clinical Infectious Diseases 32: 1511–1515. [Link: https://goo.gl/Qza6on](https://goo.gl/Qza6on)
6. Seppala H, Haanpera M, Al-Juhaish M, Jarvinen H, Jalava J, et al. (2003) Antimicrobial susceptibility patterns and macrolide resistance genes of viridans group streptococci from normal flora. J Antimicrob Chemother 52: 636–644. [Link: https://goo.gl/eCbEpf](https://goo.gl/eCbEpf)
7. (2006) Performance standards for antimicrobial disc susceptibility tests; Sixteenth edition. Approved Standard. Wayne. PA: CLSI. [Link: https://goo.gl/Mxqpq8c](https://goo.gl/Mxqpq8c)
8. Laupland KB, Ross T, Church DL, Gregson DB (2006) Population-based surveillance of invasive pyogenic streptococcal infection in a large Canadian region. Clin Microbiol Infect 12: 224–230. [Link: https://goo.gl/v1ekd6](https://goo.gl/v1ekd6)
9. Aracil B, Gomez Garces JL, Alos J I (1999) a study of susceptibility of 100 clinical isolates belonging to the Streptococcus milleri group to 16 cephalosporins. J Antimicrob Chemother 43: 399–402. [Link: https://goo.gl/1tNfGg](https://goo.gl/1tNfGg)
10. Tracy M, Wanahita A, Shuhatovich Y, Goldsmith E A, Clarridge J E, et al. (2001) Antibiotic susceptibilities of genetically characterized Streptococcus milleri group strains. Antimicrob Agents Chemother 45: 1511–1514. [Link: https://goo.gl/JyqQj7](https://goo.gl/JyqQj7)
11. Margot E G, Christopher S, Michael D P, Christina S E, Harvey R R, et al. (2010) Macrolide and Clindamycin Resistance in Streptococcus milleri Group Isolates from the Airways of Cystic Fibrosis Patients. Antimicrob. Agents Chemother 54: 2823-2829. [Link: https://goo.gl/29a4yV](https://goo.gl/29a4yV)